The Impact of Smart Meter Technology on the Quality of Electricity Service and Innovation

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Major changes in the energy sector present new challenges for utilities and power producers that will require substantial amounts of innovation. Digital technologies that provide substantial amounts of new data, such as smart meters, have the potential to enable process and practice innovations or identify infrastructure investment needs. If utilities and power plant operators engage with such data, they can enhance operational efficiency, environmental performance, and quality of service. Yet utilities are notoriously slow to change and relatively little is known as to how both utilities and power plants respond to the introduction of smart meters.

In this (early-stage) paper, we study how electric utilities' deployment of smart meters impact the quality of electricity service in the U.S. We have obtained data on all utility-level advanced metering infrastructure projects across the U.S. over the past 15 years, which includes technologies of increasing sophistication. We have matched it to various other data sets to construct measures of quality, investments, performance, and productivity. So far, our preliminary results indicate that smart meters reduce electricity losses—one key indicator of reliability—although we are still refining our identification strategy. We are examining the effects on the productivity and investment behavior of utilities and power plants using their financial statements and operational data to examine whether this is achieved through innovation. Finally, we plan to explore the distributional effects of such improvements on consumers.